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Office Memorandum • UNITED STATES GOVERNMENT

TO : Director, PIC

DATE: 8 June 1959

FROM : Special Assistant to the Director, PIC

SUBJECT: Catadioptric Lenses

25X1D

1. A catadioptric lens system designed for aerial use with a desired focal length of [redacted] inches probably would have the following characteristics:

25X1D

[redacted]

Cost: Approximately the same as a conventional system

Enclosure (1) is a graph showing the change in Hyperfocal distance and the change in resolution as the aperture changes.

In order to eliminate the sensitivity to temperature change, the mirrors and optics should be made of quartz and the metal parts of invar metal. In addition, it would be best to encapsulate the entire system in order to more easily control the environment.

The catadioptric lens may have its mirror surfaces coated with different substances which will cut off any of the spectrum below blue, green, or yellow as desired and pass the remaining portion of the spectrum without peaking or sloping off. A catadioptric lens may be panned, thus giving adequate coverage in spite of the limited field of view.

2. Old Delft of the Netherlands has been taking departures from the catadioptric system with their Schmidt-Bower lens. The Navy is presently testing such a lens at APEL, and the Air Force has just completed contracting for an F 0.85 system to be used for low-ambient light photography better known as moonlight photography.

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25X1A 3. It is recommended that a true catadioptric system be investigated further due to its many potentialities of high resolution, compactness, and light weight. It is further recommended that the following lens designers,

25X1A [redacted], be contacted in order to better determine the feasibility of a catadioptric system.

25X1A [redacted]

Enclosure

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PIC/D-114-59
9 June 1959

MEMORANDUM FOR: Deputy Director (Plans)

SUBJECT: Catadioptric Lenses

25X1A

1. In response to your memorandum of 20 May 1959, I have had [redacted] make a preliminary investigation of the real and theoretical characteristics of a catadioptric lens as it might be designed for aerial use. His report is attached hereto for your information and retention.

25X1A

2. I believe that [redacted] has made a fair estimate of the theoretical properties of the lens and has tried to be helpful by recommending the names of certain optical specialists who might be contacted for further details or design studies. However, we feel that these investigations would more properly fall to your staff with PIC in standby to review them and offer recommendations. It is suggested that you might want to have Dr. James Baker review this and offer his endorsements or recommendations. There is no question about the performance of these lenses for astronomic and terrestrial work, but the degradation effects on image quality of a less highly stabilized aerial platform must be critically evaluated.

ARTHUR C. LUNDAHL
Director,
Photographic Intelligence Center

25X1A

Attach: Memo from Mr. [redacted] to D/PIC, dtd 8 June 1959

cc: DD/I

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